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REMARKS

Claims 1-5 and 7-18 are pending herein.

1. Claims 12, 15, and 16 were rejected under 35 USC 112. The claims have been amended to overcome the rejection.

2. Claims 1-5, 8-13, 15 and 16 were rejected under 35 USC 103(a) as being unpatentable over Weismann et al. in combination with either deBarbadillo, II et al. or Yoshida further in combination with Lee et al. This rejection is respectfully traversed for the following reasons.

The claimed invention is drawn to a process for producing long lengths of layered superconductor. The claimed invention particularly calls for coating a buffered metal substrate tape with precursors carried out during the process of metalorganic deposition (MOD). Further, the claimed invention particularly calls for translating the tape through a precursor conversion zone in a process chamber at a rate of at least about 10 meters per hour. Conversion or completion of MOD films is an *ex situ* process, wherein the conversion of deposited precursor occurs very slowly, with film conversion on the order of one Å per second. This is of particular importance in a dynamic process wherein the substrate is translated through the conversion zone. Here, the throughput of the process is a function of the conversion rate and the size of the conversion zone, and state of the art dynamic MOD processes are limited to a throughput of about 1 meter per hour or less. In particular, Applicant has discovered that in the context of a dynamic process in which a tape is translated through a conversion zone, it is quite difficult to maintain uniform distribution of water vapor. Accordingly, Applicant has incorporated a showerhead into the claimed process flow for distribution of oxygen and water vapor, and has found that its use not only improves throughput a full order of magnitude, but also improves the crystallographic texture of the converted superconducting coating, thereby providing improved superconducting properties of the coating.

Turning to the cited prior art, it appears that the PTO has relied upon the primary reference Wiesmann et al. for disclosure of an *ex situ* process flow in which a coated substrate is subjected to water vapor and oxygen to convert the coating to a superconducting material. Since

the disclosed process is static, and does not incorporate translation of a coated substrate through a conversion zone, the PTO has looked to secondary references Yoshida or deBarbadillo, II et al. However, neither Yoshida nor deBarbadillo, II et al. are directed towards the conversion of precursors as part of a MOD process. Rather, Yoshida teaches a dynamic in-situ PLD process in which preformed HTS material is ablated from a target and deposited without conversion upon the substrate. DeBarbadillo, II et al. teach the oxidation of HTS precursor alloy, not the formation of a layered HTS material by coating and conversion as in MOD. Neither of these references recognizes particular requirements of a large conversion zone for a dynamic MOD process. Additionally, neither Yoshida nor deBarbadillo, II et al. teach or remotely suggest a MOD conversion process with a throughput of at least about 10 meters per hour.

Further, the combination of Wiesmann et al. and Yoshida or deBarbadillo, II et al. does not disclose or suggest use of a showerhead through which oxygen and water vapor are introduced. In fact, deBarbadillo, II et al. disclose use of conduits 25 and 27 through which oxygen is fed for superconductor conversion, not a showerhead. In an attempt to cure the deficiencies of Wiesmann et al., Yoshida and deBarbadillo, II et al., the PTO has looked to Lee et al.

Lee et al. disclose a chemical vapor deposition (CVD) chamber which is generally used for semiconductor fabrication, particularly, coating semiconductor or silicon wafers with a chemical vapor deposited coating. While generally related to the semiconductor arts, Applicant acknowledges that Lee et al. make a background reference to metalorganic chemical vapor deposition (MOCVD) for forming superconductive thin films. MOCVD is an *in situ* process wherein the gaseous precursors are converted as deposited upon the substrate. The claimed invention is directed towards an *ex situ* process, wherein the gases provided through the showerhead are involved in the conversion process of precursors already deposited upon the substrate. Additionally, MOCVD has a much higher conversion rate, about 1-5 microns per minute, compared to the conversion rate of MOD, about 1 Å per second. Further, Lee et al. disclose a static chamber and fails to disclose or suggest translating a substrate tape at a rate of at least about 10 meters per hour.

Foremost, the cited prior art fails to teach or remotely suggest translating a substrate through a MOD conversion process at a rate of at least about 10 meters per hour.

Further, Applicant respectfully submits that absent Applicant's own disclosure, that one of ordinary skill in the art would have recognized the combination of the static *ex situ* MOD process of Wiesmann with the dynamic deposition process of Yoshida or the dynamic oxidation process taught by deBarbadillo, II et al. and incorporated the showerhead of Lee et al. therein. The cited prior art fails to recognize the particular need of a large conversion zone and the requirement for uniform distribution of O_2 and water vapor throughout such a conversion zone in the dynamic MOD process of the claimed invention.

Additionally, as stated above, Applicant has discovered that utilization of a showerhead in the context of the claimed dynamic conversion process addresses notable challenges in the context of a dynamic, continuously translating tape in MOD. Particularly, incorporation of a showerhead for flow of conversion gases in the claimed dynamic process significantly improves the throughput of the process. The art of record nowhere discloses or even remotely suggests such advantages, and such advantages are indicative of the non-obviousness of the claimed invention. It is also emphasized that it was Applicant's discovery, not that of the prior art, of degradation and superconducting properties when converting from a static conversion process to a dynamic conversion process, which lead to development of the claimed invention.

For at least the foregoing reasons, Applicant respectfully submits that the presently claimed invention would not have been obvious over the cited prior art. Accordingly, reconsideration and withdrawal of the 103 rejection is respectfully requested.

3. Claim 7 was rejected under 35 USC 103(a) as being unpatentable over Weismann et al. in combination with either deBarbadillo, II et al. or Yoshida further in combination with Lee et al. further in combination with Manabe et al. or Weinstein. Claim 14 was rejected under 35 USC 103(a) as being unpatentable over Weismann et al. in combination with either deBarbadillo, II et al. or Yoshida further in combination with Lee et al. further in combination with Ott et al. Applicant respectfully submits that Manabe et al., Weinstein, and Ott et al. fail to address the deficiencies of Weismann et al., deBarbadillo, II et al., Yoshida and Lee et al. as discussed above. Accordingly, withdrawal of these rejections is respectfully requested as well.

Applicant respectfully submits that the present application is now in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims.

Should the Examiner deem that any further action by the Applicant would be desirable for placing this application in even better condition for issue, the Examiner is requested to contact Applicant's undersigned attorney at the number listed below.

The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-3797.

Respectfully submitted,

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Date

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